Measure: Rental Housing Energy Efficiency Initiative (E2 / E3 / E16 / E17)

Design and implement a City-wide ordinance establishing requirements for landlord disclosure of energy use for rental housing, creating a City-sponsored energy efficiency awareness program, and establishing a minimum energy efficiency retrofit requirement upon transfer of rental property.

Energy savings and greenhouse gas emissions reductions will be a function of the effectiveness of the awareness and landlord disclosure initiatives as well as the annual transfer rate for rental housing properties within the City.

Emission reduction potential in 2020:	15,650 tCO_2e/yr.
Percentage of goal (2012):	0.1%
Percentage of goal (2020):	0.7%
Total annual average implementation costs:	$910,000
Entity that bears the costs of implementation:	Rental unit owners
Cost/Savings per tCO_2e:	Savings $9/tCO2e
Net annual savings 2012-2020:	$86,667
Entity that realizes the financial return:	Renters or landlords
Equitability (progressive/regressive, income/revenue neutral, etc):	Could be progressive if renters obtain most of the financial benefits
Potential unintended consequences:	Landlord resistance

Background information:

Nationwide, sixty-one percent of the residential rental housing units that will exist in 2030 have already been built.[1] There is no longer that best, first chance to build these homes and apartments to meet modern building energy efficiency standards. However, we know from countless examples across the U.S. that modest investments in energy efficiency retrofits in existing housing stock can reduce carbon emissions and cut utility bills by as much as 20 to 30 percent.[2]

Achieving energy efficiency in rental housing poses a different set of challenges than for owner-occupied homes. One major barrier to investment in energy efficiency for rental housing is known as the split incentive – when those responsible for paying energy bills are different than those making capital investment decisions.

Split incentives are common in rental properties where tenants pay the energy bills, but owners pay for the upgrades. Building owners rarely invest in energy efficiency improvements when renters are those who would see the savings. And tenants seldom invest in a property they do not own even if they would see the benefits of lower energy bills.

Rental housing owners are not a centralized group, making it a challenge to disseminate information and resources and regulate energy efficiency in the rental sector. Engaging tenants around energy efficiency is a challenge due to tenants often not having the necessary information to make regarding improved energy efficiency and the cost savings that would accrue to them. Continuing education and outreach to tenants often helps address some of the behavioral energy use issues.

Programs to improve energy efficiency in rental housing generally fall into a few discrete categories: (1) programs funded by energy utilities; (2) programs initiated by rental owners combined with energy education efforts directed at tenants; (3) local government requirements for energy efficiency upgrades upon resale; and (4) energy efficiency audits and subsequent improvements provided by community organizations, often non-profits or government housing authorities using state or federal grant funds.

Energy efficiency policy approaches in the rental housing sector will differ depending on who pays for utilities. Many multi-family rental units have a single meter, meaning that individual unit's energy use is not measured or specifically billed to the tenants. In this case, landlords pay the utility charges and include a pro-rated charge to all tenants in their monthly rent.

There is no incentive for individual tenants to lower consumption or even see what their consumption amounts to over any billing period. In some cities, this percentage can be as high as 80%. In the absence of utility data on the percent of individual v. bulk metering in the Tucson rental housing sector, we estimate 75% of all rental units to be bulk metered.

Those rental units where tenants are individually billed for utilities are open to a different set of incentives and policy options than those that are common-metered and billed. This initiative includes actions we believe most effective in achieving energy efficiency savings in each of the two categories of rental utility billing.

As smart grid technologies evolve, utilities may install or at least offer individual meters to rental units that are not presently metered. An investment in smart grid technology could generate incentives for renters to save energy depending on how the smart grid program is structured. We are not including an analysis of such an option as it appears premature within the City at present. Should this change over time, it will be worth revisiting the rental housing sector to see if additional energy savings and greenhouse gas emission reductions are available.

Status Quo / Business as Usual:

The Tucson Electric Power Company does provide some general billing information (highest/lowest monthly bill, 12 month average) for any property in the City for a year prior to an inquiry. However disclosure is not automatic nor does it include specific units of energy consumption such as kWh. [3]

Both the City of Tucson and the Tucson Electric Power company sponsor energy efficiency education programs targeted broadly across the community. We could find no programs specifically designed to address the disincentives to energy efficiency upgrades in the rental housing sector. In the absence of this initiative, business-as-usual would see little improvement in the overall energy efficiency of the rental housing stock in Tucson, with lost economic opportunities and other co-benefits described below.

According to the Regional Greenhouse Gas Inventory update of October 2010, natural gas is a small component of City greenhouse gas emissions, contributing about 5% to the 2008 total.[4] While general energy efficiency awareness, disclosure, and retrofit on transfer may likely yield reductions in natural gas usage in rental units with gas service, this initiative focuses solely on the cost and greenhouse gas savings potential of reduced electricity use only.

Description of Measure and Implementation Scenario:

This “Rental Housing Energy Efficiency” initiative combines three elements:

1) An energy use disclosure requirement for rental housing where tenants are responsible for their own energy costs;

2) A more aggressive energy efficiency awareness and outreach program championed by the City’s housing authority and supported by landlords as well as the Tucson Electric Power company and Southwest Gas; and

3) A minimum energy efficiency retrofit requirement upon ownership transfer of rental property.

More specifically, the initiative involves:

1) Directing City staff to work through the Pima Association of Governments and with the support of the local utilities to craft an outreach program aimed at delivering quality energy efficiency advice to renters and landlords within the City.

2) Enactment of an ordinance that requires a minimum level of energy efficiency upgrades upon transfer, similar to the Burlington VT model described below.

3) Enactment of an ordinance that requires landlord disclosure of past monthly energy consumption and cost data to each prospective tenant prior to rental.

Has the Measure been implemented elsewhere and with what results:

Although the three program components identified above have been individually implemented in various jurisdictions nationwide, no program has combined the three elements into a single initiative. Individual experiences are as follows:

Energy Disclosure Requirement

Various locales throughout the U.S. have implemented energy consumption disclosure requirements in the rental-housing sector. One of the earliest rental disclosure programs was enacted into law in Maine in 2006.[5] This law requires that any landlord of residential property provide potential tenants a residential efficiency disclosure statement containing information about heating systems, insulation levels, windows and doors, and appliances.

The landlord is required to provide the statement to any person who, in person, requests a copy of the statement and said statement is to be posted in a prominent location at the property being offered for lease or rent.

The law further requires that upon entering into a contract with a tenant or prior to having received a deposit for the rental property, the landlord must provide the tenant the disclosure statement that must in turn be signed by the tenant. The signed, disclosure statement is retained by the landlord for a minimum of seven (7) years. The form also highlights an existing law by which renters can get the prior year's electric and gas costs by calling utility companies.

The disclosure statement is intended to help prospective tenants make informed decisions about energy consumption prior to renting a property.

This law also required the preparation of energy efficiency standards that are suggested for rental properties used as a primary residence. They remain voluntary at the present time and are intended to provide guidance to landlords seeking to improve the efficiency of rental properties. Together, the disclosure form and efficiency standards were designed to result in improved energy efficiency over time, as landlords and renters become more knowledgeable about ways to improve building efficiencies.

While there was no evaluation component built into the Maine law, there is anecdotal evidence of energy efficiency improvements being made in rental housing as a result of the disclosure requirement.[6]

Different programs vary regarding the information to be disclosed. Some require full-scale energy use benchmarking using Energy Star or other building energy performance methodologies. Others simply require that the monthly energy use (electricity/natural gas) be provided to tenants prior to a rental transaction.

Mandatory disclosure policies are an important tool in the toolbox to incentivize cost-effective energy savings. To lead to action, the disclosure information should also assist renters by recommending appropriate energy-efficiency improvements, providing financial analyses, referring to government or utility incentives, referencing financing opportunities, and providing options for more detailed analysis of an apartment or building's energy use.

Energy Efficiency Awareness

An energy efficiency awareness program implemented at a public housing complex in Minneapolis involved the building owners conducting a workshop for tenants to talk about ways that they could reduce their energy usage through behavioral changes. The landlord offered a one-time $25 rental discount for those who attended and installed the free energy efficiency materials that were distributed.

The focus of the workshop was low-cost and no-cost measures to save energy, such as turning off lights and electronics, using power strips, taking shorter showers, and installing basic materials like CFLs, window insulation kits and weather stripping.

The workshop was hosted by the building caretakers, who were interested in a workshop not only for the topic but also as a way to bring people in the building together. However, there were mixed results. Out of twelve households that attended the workshop, only two people installed the free materials, even with the extra incentive. The lesson learned in this example was that a single workshop and a small one-time rent reduction was insufficient incentive to elicit renter participation.

Time of Sale Minimum Energy Efficiency Ordinance

The City of Burlington VT has enacted a time of sale minimum energy efficiency ordinance for rental housing.[7] The ordinance specifies several minimum upgrades to a

building's energy efficiency that are required upon transfer. The total cost of the required improvements must not exceed 3% of the sales price as listed on the property transfer tax return or $1,300 per rental unit, whichever is less.

After this, the ordinance only mandates the installation of measures that have a simple payback of seven years or less. Simple payback is the cost of doing the measure divided by the yearly energy savings.

The City of San Francisco also has an energy efficiency upgrade requirement applicable to rental housing.[8] The San Francisco program requires an inspection and improvement in building energy efficiency prior to sale. A report from Earthfuture.com on the San Francisco program states that "the cost to San Francisco's city budget has been nil, and the cost of enforcement through the city's Housing Inspection Services Division has been very inexpensive."[9]

While not a time-of-sale energy efficiency measure, Ordinance 7726 recently enacted by the **City of Boulder, Colorado** establishes minimum energy efficiency upgrades for most rental housing units in the city.[10] Under the program, landlords are required to make improvements that could include installing energy-efficient appliances, sealing ducts or better insulating. Rental properties are required to achieve 100 "points" -- including two points of mandatory water conservation -- based on a lengthy list of possible improvements.

Property owners could opt out of the points system by proving the energy efficiency of their rental units through a Home Energy Rating System test. Buildings have to score high enough to equal the efficiency of the points system. The costs for making energy upgrades would vary widely based on the age and overall condition of rental properties.

The city of Boulder recently completed testing on seven homes and found that reaching the 100-point threshold cost between $675 and $3,243 each. The city estimates that a landlord's investment of $2,000, for example, would cost an additional $17 a month over 15 years.[11]

Energy/Emission analysis:

Due to the absence of whole-system implementation of this initiative, expected energy savings are difficult to estimate and thus exhibit a range of uncertainty. This uncertainty and the assumptions we use are made explicit in the analysis that follows.

The 2010 American Community Survey (ACS) for the Tucson *urbanized area* indicates 111,048 occupied housing units paying rent.[12] City-data.com shows a rental-occupied housing number for the City of Tucson of 89,717 in 2009.[13] As the ACS number includes rental-housing units outside the city limits, we are using the City-data.com number, rounded to 89,000 (due to current, historically high vacancy rates) as our conservative estimate of rental housing units in the City.

Average electricity consumption for a Tucson household is approximately 11,000 kWh/year.[14] Absent an electricity consumption value specific to rental units, we are assuming that rental units (smaller in average size than single family houses) consume 9,500 kWh/year.

The first component of this Rental Housing Energy Efficiency measure, the energy disclosure requirement, is similar to the deployment of a smart meter in that it provides a household with energy consumption values that are anticipated to drive behavior change in the form of reduced energy consumption. Smart meters do this via real-time information available to consumers. A year-long Department of Energy study of Illinois' Commonwealth Edison's smart meter program showed an average 10% reduction in home energy use after the meters were installed.[15]

[There is a separate GHG reduction measure addressing residential smart meters elsewhere in this report.]

We anticipate the reduction in energy use per household as a result of energy disclosure in rental units without smart meters to be similar to that achieved with a smart meter program. Thus, we are assuming an energy savings reduction of 10% of the annual average consumption (or 950 kWh/year).

We estimate, based on trends in other cities, that 75% of the rental housing market in Tucson includes energy costs as part of the monthly rent. Of the 89,000 rental units estimated to be currently occupied in Tucson, only 22,250 units would have individual electricity meters. Further, we conservatively assume that only 25% of the rental households (or 5,562) participate in the form of energy-reducing behavioral change based on disclosure information.

Using the expected annual electricity savings of 10% for these 5,562 participating rental households yields an annual energy savings of 5,283,900 kWh [5,562 participants x 950 potential kWh savings per participating rental unit].

We estimate that 20% of the 5,562 targeted rental participants will be engaged at the end of 2012, with full implementation by the end of 2016. First year savings therefore would amount to 1,056,780 (5,283,900 x .20). By the time of full implementation this measure will result in cumulative savings of 50,058 kWh.

[Should energy disclosure information elicit participation of the full 22,250 rental households with individual metering, at the identical 10% annual energy use reduction, there would be a maximum achievable annual energy savings on the order of 21,137,500 kWh, and 211,375,000 kWh savings cumulatively over ten years.]

The energy efficiency awareness campaign proposed as a component of this measure is intended to help ensure the results projected above. No independent, additional energy savings are projected in an effort to avoid double counting, however this

education effort in collaboration with key stakeholders is seen as crucial to the success of the measure.

Finally, there will be additional energy savings and GHG reductions as a result of an energy efficiency requirement at the time of rental property transfer. Again, to avoid double counting, we only work with the percentage of the rental housing stock believed to be single-metered at present, or 66,750 rental units. We apportion the projected rental real estate transfers similarly.

In 2009, there were no "arms-length" transactions of 100+ unit properties and only two properties of 40-100 units traded hands.[16] Eleven 12 to 39-unit buildings changed owners. As of early 2009, there were approximately 25 major apartment properties in the process of foreclosure in Tucson. Thus, picking mid-point ranges for the transfers listed above, we estimate a total of approximately 415 rental units changing hands in 2009, the last year for which actual data are available.[17]

If 75% of those are single-meter units, then we estimate 311 of them would have benefited from energy efficiency upgrades that a time-of-sale ordinance would deliver.

For the three years prior to 2009, rental housing property transactions were 2-5 times the 2009 number. Transactions of single-metered rental units began falling from an estimated 2,400 units in 2006 to the estimated 311 in 2009.[18]

For the period to 2020, we estimate that an average of 700 units of single-metered rental housing will change hands per year based on continuing lag in recovery of the rental housing market, current home and likely future home foreclosure rates, and lower rental vacancy rates.

Using the low end of the Affordable Housing Finance account cited earlier, we assume a modest 20% improvement in energy efficiency upon retrofit. These retrofit improvements are generally fixed to the premises (apartment envelope, windows, heating/cooling units, etc.) so would continue annually as renter turnover occurs. Thus for the first and each succeeding year the average annual rental housing energy savings per unit would be 1,900 kWh (20% x 9500 kWh/unit/year).

The total expected annual energy savings from this three-component initiative are the following, assuming all energy saved is electricity:

2012:
Energy disclosure requirement: 1,056,780 kWh
Efficiency transfer requirement: 700 x 1,900 = 1,330,000 kWh
Total: 2,386,780 kWh

2020:
Energy disclosure requirement: 5,283,900 kWh
Efficiency transfer requirement: 700 x 1,900 x 9 yrs = 11,970,000 kWh
Total: 17,253,900 kWh

Cumulative savings 2012-2020:

2012 GHG emissions reductions: 2,386,780 kWh x 2 pounds/kWh = 4,473,560 pounds (divided by 2,205 pounds/metric ton) = 2,165 tCO_2e.

Emissions savings in 2020 amount to 17,253,900 kWh x 2 pounds/kWh = 34,507,800 pounds (divided by 2,205 pounds/metric ton) = 15,650 tCO_2e.

Accumulated emissions savings by 2020: 87,834 tCO_2e.

Climate change impact summary in tCO_2e:

COT 1990 Citywide GHG emissions (baseline):	5,461,020
MCPA 7% reduction target for COT:	5,078,749
2012 BAU GHG emissions projection:	7,000,000
2020 BAU GHG emissions projection:	7,343,141
GHG emissions reduction to meet 7% goal (2012):	1,921,251
GHG emissions reduction to meet 7% goal (2020):	2,264,392
Contribution of this Measure:	2,165 in 2012; 15,650 in 2020

Economic analysis:

Initiative Costs

The cost of the energy disclosure requirement would be borne by landlords but is expected to be nominal. An energy awareness campaign would be expected to build on existing City and utility initiatives, combined with involvement of apartment owners and realtors.

The costs should be nominal though more proactive promotion of energy efficiency benefits may initially require redirection of existing staff resources to build the coordinated outreach program needed to achieve benefits from the disclosure requirement.

The mid-point cost in Boulder's 100 point program suggests an average of $2,000 to upgrade each rental unit to achieve Boulder's 100 point goal.[19]

We project an average $2,000 cost to upgrade each rental unit upon transfer to achieve a 20% reduction in energy use. Actual costs for units needing the least amount of efficiency upgrades or those offering the most low-cost potential for efficiency upgrades suggest to us that the projected $2,000 cost per unit should be designed in as a cost cap pending evaluation of early program results.

Therefore we estimate that the average cost per retrofit in Tucson would be on the order of $1,300/unit. This cost per unit could be borne initially by the landlords and recovered via reduced energy costs to the same landlords. Retrofits of an average of 700 units/year would have a capital cost of $910,000/year.

Initiative Savings

Local utility rates in Tucson are tiered based on amount consumed and time-of-use. We are using an average of $0.08 kWh in 2011 rising 2.4%/yr as the cost/kWh saved.

Thus, energy cost savings in 2012 would be $195,525; by 2016 annual cost savings are $1.075 million; by 2020 the annual cost savings are $1.709 million.

Net Economic Impacts

Initiative Costs to 2020:	$8.19 million
Initiative Savings to 2020:	$8.97 million
Net Cost:	$0.78 million

With a 1.5 multiplier of the energy savings, the positive net impact is projected at $1.17 million.

The savings per tCO_2e is $0.78 million divided by 87,834 = $9.

Extended to 2036, the Initiative's accumulated savings reach $62 million.

Co-benefits:

Co-benefits include the following that largely depend on the supply and demand for rental housing at any given time:

1) Landlords or tenants will pay less for energy, leaving more of their disposable income available for expenditures that may have a high multiplier for the Tucson region.

2) If supply of rental housing exceeds demand, landlords may not be able to charge more for energy efficient rentals, effectively reducing the total rental costs for tenants (total costs being rent plus utilities.)

3) Tenants are better positioned to withstand periods of temperature extremes at the same or lower cost of energy, potentially reducing healthcare costs.

4) If regional electricity demand is reduced, regional electricity rates are likely to increase less since new power plants may not be required or may be delayed.

Equitability:

The measure is generally progressive in that it ultimately results in lower energy bills for renters, a category of Tucson households without access to many of the traditional energy efficiency resources and financing mechanisms available to homeowners.

Potential unintended consequences:

Most landlords of single-metered rental housing units or complexes should be able to understand the economic benefits accruing to them from energy efficiency retrofits to their buildings. However, there may be initial resistance from some landlords due to unfamiliarity with energy efficiency measures generally as well as a possible preference for their traditional use of energy cost pass-throughs via rent.

There will need to be an initial outreach and education element to this activity as well as information on resources available to conduct quality energy efficiency retrofit work.

Endnotes

[1] "Getting Serious About Energy Efficiency in Affordable Rental Housing." *Affordable Housing Finance*, April 2008.

[2] Ibid.

[3] UA student report for Tucson Electric Power, 2009.

[4] Pima Association of Governments, "Regional Greenhouse Gas Inventory," October 2010.

[5] Maine State Housing Authority, at: http://www.mrema.org/documents/Notice_2006-07_5-1-2006.pdf.

[6] Portland Press Herald, December 10, 2006, at: http://business.mainetoday.com/news/061210apartments.html.

[7] City of Burlington Electric Department, at: https://www.burllingtonelectric.com/page.php?pid+43&name=time_of_sale#applicability

[8] City of San Francisco, "What you Should Know" Residential Energy Conservation Ordinance, at: http://www.recaonline.com/docs/arc/arc2008/PointofSale_SanFranCA.pdf.

[9] Earthfuture. http://www.earthfuture.com/seconomy/sei13.asp.

[10] City of Boulder, Colorado Ordinance 7726. 2010.

[11] Boulder Daily Camera. April 18, 2010. http://www.dailycamera.com/boulder-realestate-news/ci_14903488.

[12] American Community Survey. 2010. http://factfinder.census.gov/servlet/ADPTable?_bm=y&-geo_id=40000US88732&-qr_name=ACS_2009_5YR_G00_DP5YR4&-context=adp&-ds_name=&-tree_id=5309&-_lang=ed&-redoLog=false&-format=.

[13] City-data.com.

[14] Tucson Electric Power. Op cit.

[15] The Forum. August 6, 2009. http://forumnewsgroup.blogspot.com/2009/08/con-edison-launches-smart-meter-program.html.

[16] TucsonCommercial.com. http://tucsoncommercial.com/images/2010_CCIM_ForecastSmall.pdf.

[17] Ibid.

[18] Ibid.

[19] Boulder Daily Camera, Op cit.